



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,619	01/06/2006	Yusuke Hashimoto	80075(302721)	1909

7590 02/18/2009
EDWARDS ANGELL PALMER & DODGE LLP
James E. Armstrong, IV
P.O. Box 55874
Boston, MA 02205

EXAMINER

ARMAND, MARC ANTHONY

ART UNIT	PAPER NUMBER
----------	--------------

2814

MAIL DATE	DELIVERY MODE
-----------	---------------

02/18/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/563,619	Applicant(s) HASHIMOTO ET AL.	
	Examiner MARC ARMAND	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 13-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☒ Claim(s) 6-12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

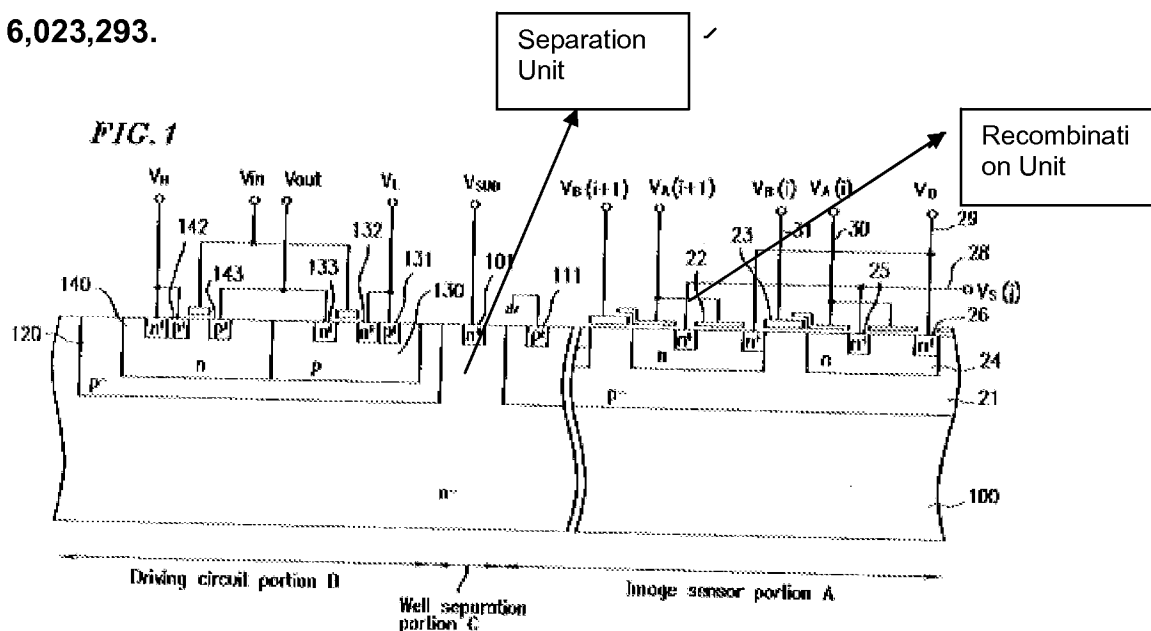
Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1-3, 5 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Watanabe et al., (Watanabe) USPAT 6,023,293.**



Regarding claim 1, Watanabe shows in fig.2, a light detecting element formed in a semiconductor device, the light detecting element comprising:

- a photosensitive unit (image sensor portion A) for receiving light irradiated from a light source, said photosensitive unit generating electrons and

Art Unit: 2814

holes each of which the number varies with quantity of light received at the photosensitive unit (col.13,line 14-40);

- a carrier separation unit (separation shown above) with a separation control electrode (22)(col.15,line 5-10), said carrier separation unit (shown above) separating the electrons and holes generated at said photosensitive unit into object carriers (electrons) and non-object carriers (holes)(col.13,line 15-40) according to control of electric potential applied to the separation control electrode, said object carriers being one of the electrons and holes, said non-object carriers being another of the electrons and holes;
- a recombination unit (shown in figure above)(col.13,line 15-25) with a recombination control electrode (22), said recombination unit (shown in fig above) stimulating recombination between the object carriers generated at said photosensitive unit (image portion A) in a light period and the non-object carriers generated at said photosensitive unit in a extinction period according to control of electric potential applied to the recombination control electrode, said light period being a period of time that said light source is operated, said extinction period being a period of time that said source is extinguished;
- an output unit (23, 24) for picking out the object carriers which remain after the recombination at said recombination unit.

As for the statements “to control of electric potential applied to the separation control electrode, said object carriers being one of the electrons and holes, said non-object carriers being another of the electrons and holes”; “to control of electric potential applied to the recombination control electrode, said light period being a period of time that said light source is operated, said extinction period being a period of time that said source is extinguished” are considered functional limitations. Labels, statements of intended use, or functional language do not structurally distinguish claims over prior art. The structure of the device is substantially identical to that of the claimed structure which can function in the same manner, be labeled in the same manner, or be used in the same manner. *MPEP 2112.01*.

Regarding claim 2, Watanabe shows in fig.2, a light detecting element wherein said carrier separation unit (24, 25) adjusts so that the number of the object carriers is larger than the number of the non-object carriers, said object carriers being generated in the light period to be given to the recombination at said recombination unit, said non-object carriers being generated in the extinction period to be given to the recombination at said recombination unit.

As for the statement “adjusts so that the number of the object carriers is larger than the number of the non-object carriers, said object carriers being generated in the light period to be given to the recombination at said recombination unit, said non-object carriers being generated in the extinction period to be given to the recombination at said recombination unit”; it is considered functional limitations. Labels, statements of intended use, or functional language do not structurally distinguish claims over prior art.

Art Unit: 2814

The structure of the device is substantially identical to that of the claimed structure which can function in the same manner, be labeled in the same manner, or be used in the same manner. *MPEP 2112.01.*

Regarding claim 3, Watanabe shows in fig.2, a light detecting element further comprising: an object carrier holding unit (25) for gathering the object carriers generated at said photosensitive unit to hold the object carriers until the recombination; and a non-object carrier holding unit (24) for gathering the non-object carriers generated at said photosensitive unit to hold the non-object carriers until the recombination; wherein said recombination unit stimulates the recombination between the object carriers held at said object carrier holding unit (25) and the non-object carriers held at said non-object carrier holding unit (24).

As for the statement “said recombination unit stimulates the recombination between the object carriers held at said object carrier holding unit and the non-object carriers held at said non-object carrier holding unit”; it is considered functional limitations. Labels, statements of intended use, or functional language do not structurally distinguish claims over prior art. The structure of the device is substantially identical to that of the claimed structure which can function in the same manner, be labeled in the same manner, or be used in the same manner. *MPEP 2112.01.*

Regarding claim 5, Watanabe shows in fig.2, a light detecting element wherein said output unit (23, 24) has an integration function for integrating the object carriers remained after the recombination at said recombination unit.

Art Unit: 2814

As for the statements "has an integration function for integrating the object carriers remained after the recombination at said recombination unit" It is considered a functional limitation. Labels, statements of intended use, or functional language do not structurally distinguish claims over prior art. The structure of the device is substantially identical to that of the claimed structure which can function in the same manner, be labeled in the same manner, or be used in the same manner. *MPEP 2112.01*.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

Art Unit: 2814

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe as applied to claims 1-3, 5 and further in view of Komori US 2005/0116259.

Regarding to claim 4, Watanabe shows in fig.2, a light detecting element having a carrier separation unit (26, 24).

Watanabe differs from the claimed invention because he does not explicitly disclose a semiconductor device having a switch unit for disposing of the object carriers held at said object carrier holding unit.

Komori shows in fig.22, a device having a switch unit (28a) (para 0048) for disposing of the object carriers held at said object carrier holding unit.

Komori is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Watanabe. Therefore, at the time the invention was made; it would have been obvious to have a semiconductor device having a switch unit for disposing of the object carriers held at said object carrier holding unit because it will provide a device with a simple structure and reduce manufacturing steps (para 0008) and also a device with high field rate (para 0009).

Allowable Subject Matter

7. Claims 6-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not anticipate or render obvious the limitations of claims 6,8,9 : a surface electrode which is formed on the main surface of said element formation layer to face at least said well region through an insulating layer, said surface electrode having translucency; a first holding region of the second conductive type, said first holding region being formed within said well region and at the main surface side of said element formation layer as said object carrier holding unit; a second holding region of the first conductive type; said second holding region being formed within said first holding region and at the main surface side of said element formation layer as said non-object carrier holding unit.

Response to Arguments

8. Applicant argues that Watanabe does not show a recombination unit in his drawing. The Examiner respectfully disagrees because Watanabe shows in fig.1 and the picture above the recombination unit (fig above). Moreover we have a p and n the recombination will occur obviously.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARC ARMAND whose telephone number is (571)272-9751. The examiner can normally be reached on 9-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2814

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MARC ARMAND/
Examiner, Art Unit 2814

/Wai-Sing Louie/
Primary Examiner, Art Unit 2814